

# Acquisition Path of Distributive Markers in Serbian and Dutch: Evidence from an Act-Out Task

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## 1. Introduction

Languages across the world have different ways of conveying a distributive reading with different markers of distributivity. The major classification of adnominal distributive markers is between distributive key (DK) markers and distributive share (DS) markers (Choe 1987). This classification arises from the different syntactic and semantic properties these markers have, and, as a result, they yield different readings. The fundamental syntactic difference between the two is whether the marker attaches to an argument associated with the restrictor set (also called **distributive key**), marking what is being distributed over (e.g. English *each* is associated with *child* in (1a) and *the children* in (1b)), or to an argument associated with the scope of the sentence (also called **distributive share**), marking what is being distributed (e.g. Serbian marker *po* is associated with *one present* in (2)):

- (1)      **[Each child]** is carrying a present.
- (2)      Deca                      nose                      [po      jedan      poklon].  
Children.NOM    carry.PL                      DISTR   one      present.ACC  
“Children are carrying one present each”.<sup>1</sup>

While both (1) and (2) yield distributive readings (see Figure 1a), sentences that are not marked for distributivity, like in (3), yield both distributive (Fig 1a) and collective readings (Fig 1b). The preference and availability of these readings, both for distributively marked and unmarked sentences has been a well-researched topic that still leaves plenty of questions unanswered.

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<sup>1</sup> Note that *po* is not a binominal *each*, despite the similarities. Binominal *each*, although it syntactically attaches to the distributive share, it still is semantically associated with the distributive key. Furthermore, *po*, unlike binominal *each*, allows for other (event-related) readings. This discussion, however, goes beyond the scope of this paper.

- (3) Children are carrying a present.



a. Distributive reading



b. Collective reading

**Figure 1:** Distributive and collective reading for (3)

Moreover, sentences with DS markers like the one in (2) have additional readings, so-called event-distributive readings, where it is possible to distribute one-present-carrying events over time and space. The availability of multiple readings could potentially slow down the acquisition of these markers. For this reason, we are asking the following question - How does acquiring distributivity differ for children with access to DS markers compared to children learning languages that only have DK markers?

## 2. Background

Research on acquisition of universal distributive (DK) quantifiers on English (as well as Dutch) has found that children prefer distributive readings from a young age (Musolino 2009, Syrett and Musolino 2013), often allow collective readings with distributively quantified sentences (in Dutch more than in English (De Koster 2017, Rouweler and Hollebrandse 2015)), and only show evidence of knowing what *each* means around the age of 5 or 6 (Brooks and Braine 1996, Drozd 2001, Drozd et al 2017).

In contrast, although children understand distributive properties of distributive quantifiers relatively young, they often make exhaustive errors and continue doing so when older (even at the age of 11 in Dutch) (De Koster 2018, Roeper et al 2006; 2011, Brooks and Sekerina 2006). That is to say, certain properties of universal distributive quantifiers are still acquired later.

The acquisition of DS markers, on the other hand, is a largely unexplored territory. There is work by Knežević (2015; 2018) on the acquisition of the DS marker *po* in Serbian and there is also research on Hungarian *is* and numeral reduplication (Kiss et al 2013, Kiss and Zétényi 2018).<sup>2</sup> Knežević (2015) found that children are quite late in understanding the DS marker *po* - they only become sensitive to the distributive force of *po* around the age of 9 or 10. In addition, they equally allow distributive and collective situations with distributively unmarked sentences (Figure 1 with sentence (3)). This is similar to English or Dutch children (and to some degree English and Dutch adults), but the pattern contrasts sharply

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<sup>2</sup> Some data also exists on overexhaustive errors with Russian *po* (Sekerina and Sauermann 2010), but this study remained unpublished.

with Serbian adults, who find distributive scenarios without an explicit distributive marker only marginally acceptable (under 20%) (Knežević 2012).<sup>3</sup>

In another study, Knežević (2018) investigated comprehension of doubly quantified/marked sentences - with *svaki* and *po* using a picture verification task. Their assumptions were that the combination of the two markers would block collective readings and enforce both exhaustivity (i.e. exhaustively using the DK set) and atomicity (i.e. distributing down to individuals), yielding results similar to English *each*. Adults responded as they predicted (accepted only distributive exhaustive and atomic scenarios), but younger children also incorrectly accepted all other conditions (collective, non-exhaustive and non-atomic scenarios). They concluded that only at the age of 9 do the children know the truth conditions of *po*. They also concluded that at 9, children still do not completely understand *svaki*, and that *po* seems to be acquired before *svaki*. Moreover, the results seem to suggest that exhaustivity is acquired before atomicity.

However, all these studies were truth value judgment (TJV) tasks with picture verifications, so we still do not have evidence about children's default preferences and exact understanding (or lack thereof) of the DS marker *po*. The only aspect that a TVJ task offers is the availability of a certain interpretation, without a clear competitor. For this reason, we decided to tackle the question of how children acquire DS markers using an act-out task, which allows children to give a range of answers (instead of restricting their interpretations to YES and NO), where we can see how the children treat the sentences with and without markers, and how they reason while performing the task.

Act-out tasks have also been used recently to successfully contribute new information on distributivity interpretations. For instance, Kiss and Zétényi (2018) used this method to show that preschool children have the ability to multiply, which is an operation syntactically encoded in cases of quantified sentences in Hungarian.

We used the exact same task and materials with Serbian and Dutch children. Dutch has universal distributive quantifiers *elke/iedere* (=every)<sup>4</sup> and no DS markers, as opposed to Serbian, a language with both distributive quantifiers (i.e. *svaki* = every) and DS markers (i.e. *po*). In this study, we wanted to see how the presence of a DS marker, such as *po*, influences the acquisition of DK quantifiers and how it compares to languages with only DK quantifiers.

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<sup>3</sup> Another study on distributivity and morpho-syntactic cues in Serbian (Bosnić 2016) revealed that Serbian adults rejected distributive scenarios with distributively unmarked sentences, while Serbian 7-year-olds almost equally accepted both collective and distributive scenarios.

<sup>4</sup> Considering the findings that there is no real difference between *elke* and *iedere* in Dutch, as reported in several studies (Van Koert, 2016; Spenader and Bosnić 2018; De Koster et al. 2017) we excluded *iedere* from our design and further discussion.

### 3. Experiments

We developed an act-out task to uncover default interpretations children have for markers of distributivity as well as some underlying reasoning in a comprehension task. By asking children to act a situation out, we hoped to gain more insights into their response strategies.

#### 3.1. Method

**Participants:** We tested 75 native Serbian children and 60 native Dutch children using the same task and materials. In addition, 8 Serbian (MA: 43.4) and 10 Dutch (MA: 25.5) adults were tested as controls. Children were divided into three age groups in Serbian. For Dutch we had two age groups, as shown below in Table 1:

**Table 1:** Overview of Serbian and Dutch participants and information about number, mean age, range and gender

Children	Age group	Number of participants	Mean age	Range	Gender
Serbian	7-year-olds	27	<b>7;6</b>	7;1 - 8;3	11f / 16m
	8-year-olds	24	<b>8;8</b>	8;3 - 9;2	14f / 10m
	9-year-olds	24	<b>9;6</b>	9;3 - 10;0	13f / 11m
Dutch	8-year-olds	30	<b>8;1</b>	7;5 - 8;9	15f / 15m
	9-year-olds	30	<b>9;1</b>	8;7 - 10;3	14f / 16m

**Materials and Design:** Paper cut-outs of three boys and three girls served as the subjects of the test sentences. 12 unique objects (e.g. rabbits, ducks, hamburgers, toy cars, umbrellas, balloons, etc.) were used, together with three extra objects for demonstration and control sentences. Each type of object had 10 copies to avoid priming with the number of objects.<sup>5</sup>

We manipulated the **Sentence Types** (levels: distributively unmarked (*null*) sentences, quantified sentences (*svaki* for Serbian, *elke* for Dutch) and sentences with a DS marker (*po*)) and **Number of Objects** (levels: *two* and *three*) as factors. The design was a 3x2 factorial design for Serbian with 4 observation per condition, resulting in 24 test items; and 2x2 for Dutch (due to the lack of DS markers), resulting in 16 test items in total. There were also four control items for both languages (sentences with the adverb *together* to force unambiguous collective answers). The examples of test sentences were given in (4) for Serbian and (5) for Dutch:

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<sup>5</sup> Essentially, this means that children should feel comfortable if they do not use all 10 objects and it is never the case that all objects are used.

- (4)

a. Dečaci

Boys

guraju

are pushing

dva /tri

two /three

autića.

toy cars
- b. *Svaki* dečak

Every boy
- gura

is pushing
- dva /tri

two /three
- autića.

toy cars.

c. Dečaci

Boys

guraju

are pushing

*po* dva /tri

DISTR two /three

autića.

toy cars.

(5)

a. De jongens

The boys

duwen

are pushing

twee/drie

two /three

speelgoedauto's.

toy cars.

b. *Elke* jongen

Every boy

duwt

is pushing

twee/drie

two /three

speelgoedauto's.

toy cars.

Procedure: The experimenter and an assistant sat in a small room, around a table with the materials. On one side of the table, there were three paper dolls (cut-outs) of boys and three of girls, laid diagonally on each corner, to face a child. On the other side of the table there was a box with experimental materials, i.e. the objects. The experimenter explained to the child that they were going to play a computer game in which they have to arrange the objects according to the computer's instructions. Each trial that needed to be acted out appeared on the laptop one a time, in a random order for each child. The assistant identified the objects in each trial, gave them to the child, and removed them once they were arranged next to the paper dolls. The children were encouraged to simply place the objects in front of the paper dolls in such a way that it was an accurate description of the situation. Every child understood the instructions and found the task easy and enjoyable. The answers based on the arrangement of the objects relative to the paper dolls were recorded on the laptop.

Based on the arrangement of the objects, we identified three major response types children gave for the test sentences in (4) and (5) (see Figure 2).



**Figure 2:** Three major answers for sentences (4) and (5) and numeral *three*

The three responses, namely *distributive*, *simple (1-to-1) distributive* and *collective*, were predicted to be possible answers children would give and they proved to be dominant responses for the test sentences.

Based on previous findings from comprehension tasks, both in Serbian and Dutch, we expected certain differences. For instance, we predicted Serbian children would be worse than Dutch children across all conditions. In particular,

we predicted Dutch children to give more distributive answers for quantified sentences than Serbian children.

### 3.2. Results

The tables of the results are separated by the response types but averaged over the *Number of Objects* factor, for simplicity reasons. Further, they were analyzed with mixed-effect logistic models - `glmer()` function of the `lme4` package (Bates et al 2015) in R (R Core team 2014) for each type of response. In the models, however, we included *Number of Objects* as a factor. The adult results were not statistically analyzed.

#### 3.2.1. Adult results

We discuss the results from the adults first to establish the baselines we use for the children.

**Table 2:** Proportion of **three major** answers for Serbian and Dutch adults.

	Serbian			Dutch		
	Distributive	Collective	1-to-1	Distributive	Collective	1-to-1
Null	0	1	0	0.05	0.82	0.11
Quantifier	1	0	0	1	0	0
PO	1	0	0	N/A	N/A	N/A

As expected, both Serbian and Dutch adults gave distributive answers to quantified sentences (and *po* sentences in Serbian) 100% of the time. However, there are certain differences. Dutch adults gave some unexpected answers for distributively unmarked sentences - they arranged the objects collectively only in 82% of the cases, while Serbian adults have a 100% collective response to distributively unmarked sentences. In addition, 11% of the unmarked sentences were given simple 1-to-1 distributive answers by Dutch adults, but Serbians never gave such answers. In retrospect, the interpretation of unmarked sentences was heavily pragmatically influenced, as the participants commented on their responses to justify and explain their choice of arrangement (e.g. each child should have their own toy car to push, eating three hamburgers collectively makes no sense, etc.). This, however, is a rather distinct issue to consider and more research is needed.

It could be that the presence of a very strong and productive distributive marker *po* may force a much stronger conversational implicature that distributively unmarked sentences yield collective readings. Namely, if distributive meaning is intended, a speaker would use distributive markers. On the other hand, if there are no distributive markers, then the meaning intended must be collective (see Dotlačil 2010, Pagliarini et al 2012, De Koster 2017, De Koster 2018, Drozd et al 2017 and Barner et al 2011 for a study on the quantifier *only*).

This issue was also briefly discussed in Faller’s paper on a DS marker in Quechua (2001) in which she argues that this marker (which shares some properties with *po*) is strictly distributive, which means that adults would never give distributive answers to unmarked sentences even if they are pragmatically biased to be distributive.

### 3.2.2. Distributive answers

**Table 3:** Proportion of **distributive** answers for Serbian and Dutch children. Highlighted areas represent adult-like responses.

	7-year-olds	8-year-olds		9-year-olds	
	Serbian	Serbian	Dutch	Serbian	Dutch
Null	0.35	0.18	0.39	0.11	0.29
Quantifier	0.58	0.63	0.97	0.76	0.95
PO	0.49	0.38	N/A	0.61	N/A

From the table, it is clear that Dutch 8-year-olds have already fully acquired the meaning of a distributive quantifier *elke*, while Serbian children are not fully adult-like even at the age of 9. We also see that the correct understanding of *po* is lagging behind the correct understanding of *svaki*, which is contradictory to the conclusions of Knežević & Demirdache (2018), but is in line with our own predictions. Interestingly, Dutch children seem to like giving distributive answers to the *null* condition more than Serbian children at the same age.

For our mixed-effect models, we chose Dutch 8-year-olds as a reference level (Intercept). The best model fit was determined by a stepwise variable addition method and a comparison of AIC values. It revealed the interaction between a *Sentence Type* and *Age* predictors and the main effect of *Number of Objects* ( $\beta = 0.68$ ,  $p < 0.0001$ ). *Items* were retained as a random effect, together with a random slope of *Sentence Type* for *Subjects*. Statistically, Dutch 8-year-olds are (moderately) significantly better than their Serbian peers in giving correct distributive answers to quantified sentences ( $\beta = -2.94$ ,  $p = 0.03$ ), but they are not statistically different than Dutch 9-year-olds ( $\beta = 0.32$ ,  $p = 0.81$ ) and Serbian 9-year-olds, even though Serbian 9-year-olds are less likely to respond with a (correct) distributive answer to a sentence with *svaki* ( $\beta = -0.53$ ,  $p = 0.71$ ). Furthermore, Dutch 8-year-olds were no different than Dutch 9-year-olds ( $p = 0.19$ ) and Serbian 7-year-olds ( $p = 0.27$ ) in the rate at which they gave distributive answers to the unmarked (*null*) sentences, but Dutch 8-year-olds are significantly more adult-like than Serbian 8- ( $\beta = -2.83$ ,  $p = 0.006$ ) and 9-year-olds ( $\beta = -3.82$ ,  $p = 0.0004$ ).

Looking at Serbian children only, we see a significant delay of correct responses for *po* sentences, and we can conclude that, even at the age of 9, *po* is acquired significantly later than *svaki* - 7-year-olds:  $\beta = -1.78$ ,  $p = 0.02$ ; 8-year-olds:  $\beta = -4.30$ ,  $p = 0.005$ ; 9-year-olds:  $\beta = -1.47$ ,  $p = 0.05$  (reference level: *svaki*-

*three*). The models were done for each age group separately. It was found that the oldest children do not show the effect of *Items*, so the *Items* were subsequently excluded for this group only. This goes well with the predictions and adult results.

### 3.2.3. Collective answers

**Table 4:** Proportion of **collective** answers for Serbian and Dutch children. Highlighted areas represent adult-like responses.

	7-year-olds	8-year-olds		9-year-olds	
	Serbian	Serbian	Dutch	Serbian	Dutch
Null	0.23	0.34	0.32	0.61	0.42
Quantifier	0.10	0.05	0.004	0.07	0.008
PO	0.14	0.24	N/A	0.21	N/A

Collective responses **can only be correct** in the *null* condition, and should be rejected if the sentence is quantified or *po*-marked. We thus see that, although Dutch children do not give a lot of collective answers for the *null* condition (compare Serbian and Dutch oldest groups), they correctly avoid this answer for quantified sentences, which is not the case for Serbian children, especially with *po*-sentences (but not with *svaki*).

The best model fit was again found using AIC value comparisons using a stepwise variable addition method. There was no interaction between the fixed factors and there was a significant main effect of *Number of Objects* factor ( $\beta = 2.16$ ,  $p < 0.0001$ ). This means that when the number of objects was *two*, children were more likely to give a collective answer to the *null* condition. The random factors *Subjects* and *Items* were both retained, and there was a random slope of *Sentence Type* and *Number of Objects* for *Subjects*. The model showed that Dutch 8-year-olds are not different than Serbian 7-year-olds in giving collective answers to *null* condition ( $\beta = 0.75$ ,  $p = 0.51$ ), but they are significantly different than their Serbian peers ( $\beta = 2.71$ ,  $p = 0.01$ ) and, of course, older Serbian ( $p = 0.0008$ ) and Dutch children ( $p = 0.02$ ).

### 3.2.4. Simple distributive (1-to-1) answers

**Table 5:** Proportion of **simple distributive (1-to-1)** answers for Serbian and Dutch children. Highlighted areas represent adult-like responses.

	7-year-olds	8-year-olds		9-year-olds	
	Serbian	Serbian	Dutch	Serbian	Dutch
Null	0.39	0.45	0.21	0.25	0.25
Quantifier	0.30	0.30	0.01	0.16	0.04
PO	0.35	0.35	N/A	0.18	N/A



Finally, there was a type of response that was predicted as a possibility for children but not necessarily adults. We called it a *simple distributive (1-to-1)* response type (see Figure 2). In a way, this answer is somewhere between giving distributive and giving collective answers, so we often call it an intermediate pattern of response. This was undoubtedly the most peculiar result, for several reasons. First, this pattern is more prevalent in Serbian than in Dutch, and especially with the middle age group - the 8-year-olds. Second, Dutch children only give this response for the *null* condition, but almost never with the DK marker *elke* (which would also be incorrect). On the other hand, although incorrect, this response is quite common with both *svaki* and *po*-sentences for the Serbian children. Lastly, as we already mentioned, there is a small percentage of simple 1-to-1 distributive answer given by Dutch adults (11%) but not Serbian adults (0%) (which could be due to pragmatic factors, see 3.2.1). We thus encourage future research on distributivity and pragmatics, both with children and adults in order to tease apart the underlying reasoning of participants' responses.

The best model was again determined with a stepwise variable addition method and the comparison of AIC values. There was an interaction between the *Sentence Type* and *Age*, and a main effect of *Number of Objects*. *Items* were included and there was a random slope of both *Sentence Type* and *Number of Objects* for *Subjects*. This was expected, since number *three* was a very important factor in predicting this answer. Serbian 9-year-olds are no different than Dutch 8-year-olds in giving this answer ( $p = 0.70$ ), but Serbian 7-year-olds ( $\beta = 1.89$ ,  $p = 0.04$ ) and especially Serbian 8-year-olds ( $\beta = 3.19$ ,  $p = 0.0009$ ) are significantly different than Dutch 8-year-olds for giving the simple distributive answers in the *null* condition. Serbian children are also significantly different than Dutch children in giving this answer for quantified sentences.

#### 4. Discussion of the results

Considering the abundance of the results in the present study, we can make several conclusions about the acquisition of DK quantifiers and DS markers in Serbian in comparison to Dutch. We present them in the following sections.

##### 4.1. *Svaki* and *po* acquired later than *elke*

First, we showed that Serbian *po* is acquired significantly later than the quantifier *svaki* - even at 9, the children are far from adult-like in their understanding *po*. Second, the Dutch quantifier *elke* is acquired significantly earlier than Serbian quantifier *svaki*. While Dutch children are almost completely adult-like at the age of 8, Serbian children are still behind adults even at the age of 9. This finding confirms other comprehensive studies done in Dutch, stating that children already at the age of 5 understand the quantifier *elke* (Van Koert 2016, De Koster 2017), but it is contradictory to the conclusions of Knežević & Demirdache (2018) concerning the order of acquisition of *po* and *svaki*.

Knežević & Demirdache (2018) claim that 9-year-old children understand the truth conditions of *po* prior to *svaki* because the truth conditions of *po*, in their view, are less restrictive and therefore simpler. *Po* is non-atomic and non-exhaustive, while *svaki* places atomicity and exhaustivity constraints on its interpretation. However, our group of 9-year-olds made many mistakes with *po* items, giving the correct distributive answer only 61% of the time.

Knežević & Demirdache predict a stage in development where children know *po* but not *svaki*. However, among our 75 children we found only one child that had more correct answers for *po* but not for *svaki*. On the other hand, 11 children were correct for *svaki* but gave incorrect *po* answers (below 50% accuracy) (two children were at chance). However, keep in mind that Knežević & Demirdache were not able to directly check children's understanding of *po* compared to *svaki* because their stimuli only used sentences with both *svaki* and *po*. They also assume that *svaki* is atomic, that is, it distributes over individuals only. In fact, *svaki* is more like *every* than *each*, because both *svaki* and *every* do not necessarily distribute down to individuals (i.e. it is not necessarily atomic) and allow for readings that are unavailable for *each* (e.g. generic readings) (Tunstall 1998). Nevertheless, their results strongly suggest that *svaki-po* construction indeed yields exhaustive and individually distributive readings, because there is a much higher acceptance rate for *svaki-po* than for our conditions with *svaki* alone.

As for the delayed acquisition of *po*, children may be insensitive to this marker due to its productivity and multiple meanings - *po* is also a preposition, verbal prefix, adjectival prefix and a distributive marker. This instance of one form having multiple meanings was discussed in Van Hout (2008 and references herein) where she argued that one-to-many relations of form and meaning may be more difficult to acquire. We speculate that the complexity of the linguistic system for distributivity marking in Serbian might be the reason children do not understand what *po* means and what it does. It would be interesting to see which meaning of *po* comes first in language acquisition. For instance, since *po* as a preposition inherently has some distributive (or even event plurality) properties, we could compare prepositional and distributive *po* in a picture verification or a preference task.

## 4.2. Weak and strong conversational implicatures

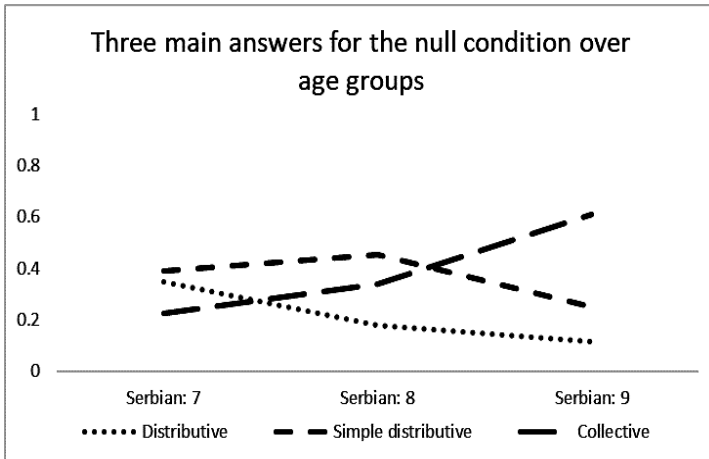
Second, even though children tend to give all three main types of responses for the *null* condition, it is observed that the adult-like collective preference for *null* condition emerges more or less simultaneously with the correct distributive interpretation of *svaki* in Serbian, but not in Dutch. In other words, the fact that Dutch children are fully adult-like with quantified sentences does not influence their rate of collective responses to unmarked sentences. In that regard, Serbian children are faster at arriving at the adult-like stage for the *null* condition. This difference between the languages is unexpected under Dotlačil's conversational implicature account. The account states that the fact that distributive marking requires distributive interpretations is the prerequisite to calculating the

implicature that no distributive marking means the speaker intended a collective interpretation. (see 3.2.1).

However, in several studies before, we have seen that Dutch *elke* allows collective interpretation (De Koster 2017, De Koster 2018, Rouweler and Hollebrandse, Spenader and Bosnić 2018), so the argument can be made that *elke* is not as strongly distributive as Serbian *po*, or even English *each* (cf. Syrett and Musolino 2013, Musolino 2009). Instead, there are more similarities with English *every*, which does allow so-called partially distributive scenarios (Tunstall 1998).<sup>6</sup> The puzzle about Dutch still remains - Why didn't Dutch children show collective readings for *elke* in the act-out when it is known that *elke* allows collective readings? We speculate it probably had to do with preference vs. availability of different readings - *elke* with collective readings is available for both adults and children, but it is not the preferred reading - the preferred and default reading is distributive.

### 4.3. The role of pragmatics

Third, the 1-to-1 distributive responses are a peculiar “intermediate” response, given by both Dutch and Serbian children, but that was not significantly present with adults of either language (Dutch adults have 11% of these answers and Serbian adults do not have them at all). In addition, it is most prominent with Serbian 8-year-olds in the *null* condition. Although statistically we cannot make strong claims (especially since we found completely adult-like 7-year-olds and very child-like 9-year-olds), there is an interesting learning trend for the null condition throughout all three age groups in Serbian (see Figure 3):



**Figure 3:** Proportion of distributive, simple distributive and collective responses for the distributively unmarked (*null*) condition

<sup>6</sup> Remember that Dutch also has a quantifier *iedere* but it seems to be identical to *elke* in distributivity (see Spenader and Bosnić 2018 for a comparison of *elke* with *iedere*).

Children start by giving more distributive answers (and simple 1-to-1 answers) for distributively unmarked (*null*) sentences than giving collective answers. The peak in giving the simple 1-to-1 answers is at age 8, but then both distributive and simple distributive answers decline while collective answers rise when children are older. However, more clues are found if we look more closely into our experimental materials and design. Recall that our design included different number of objects - either *two* or *three*. Children gave more 1-to-1 answers when the number was *three*. This comes as no surprise, considering that the same number of objects could entail a preferred symmetry with the same number of subjects. Furthermore, the choice of verbs matters, especially with Dutch participants, both adults and children. This makes sense, since all the models retained the *Items* as a random factor. A good example is “The boys are eating three hamburgers” - the most natural way of dividing the hamburgers is that each boy has one, which is precisely an arrangement that we call simple distributive. With this in mind, further research may need to include numbers that do not correspond to the number of subjects to be distributed over, as well as more languages that either have one type of distributive markers or two.

Regardless, the presence of the 1-to-1 answer is undoubtedly an interesting finding especially since Serbian children incorrectly give it for sentences containing *svaki* or *po*. This is further evidence that Serbian children do not know what *po* means, and possibly, their understanding of *svaki* is also hindered. While some Dutch children and some Dutch adults are driven by extralinguistic factors (world knowledge, naturalness, types of predicate, etc.) when giving the simple 1-to-1 distributive answer, it is unclear that Serbian kids are influenced by these factors. If they were, we would not see this response with quantified sentences throughout different items, and more importantly, there would not be such a noticeable decline in these answers between ages 8 and 9.

#### 4.4. Late distributivity acquisition in Serbian

What could then be the cause of the late acquisition of distributive markers for Serbian children? We have already hinted at one possible reason - it could easily be that the presence of an additional distributive marker affects the acquisition of both *po* and *svaki*. Recall that *po* has one form that results in many meanings, as discussed in 4.1, and it could cause significant delay in understanding distributive *po* (perhaps children understand other uses of *po* first). Also, not only *po* is an additional distributive marker in Serbian, it is also a DS marker, with different syntactic rules of attachment and many other available readings. Keep in mind that having additional distributive markers is not uncommon (e.g. *each* and *every* in English; *elke* and *iedere* in Dutch; *chaque* and *chacun* in French, etc), but all of these are DK markers that can only distribute over individuals, while DS markers can also distribute over events. Thus, two crucially different markers of distributivity, one of which has additional functions, could slow down the acquisition of both of them.

Another reason for the late acquisition could stem from the fact that there is a third competitor for achieving distributive reading - the co-occurrence of DK and DS markers. The marker *po* can co-occur with universal quantifiers, such as *all* or *every* in Serbian:

- (6) *Svaki* dečak gura *po* tri autića.  
 every boy push DISTR three toy-cars  
 “Each boy is pushing three toy cars.”

We have already mentioned the study by Knežević & Demirdache (2018), and what is especially interesting is that the combination of *svaki* (*every*) and *po* essentially yields an interpretation of a sentence comparable to a sentence with binominal *each*. *Each*, unlike *every*, is a strictly individual distributive quantifier, and since *svaki* is more like *every*, a direct corresponding word for *each* does not exist in Serbian. Instead, the effect of *each* is achieved when *po* and *svaki* co-occur in the same sentence.

This is observable in the high acceptance rate of individually (atomic) distributive readings for *svaki-po* sentences both with children and adults in Knežević & Demirdache’s study. Other readings, namely non-exhaustive and non-individual scenarios, were mainly rejected by adults and 9-year-olds but accepted by younger children. Here, too, we see that children have problems understanding the requirements of the universal quantifier *svaki*, but 9-year-olds in Knežević & Demirdache’s study are more adult-like than our group of 9-year-olds. This indicates that children might understand that *svaki-po* construction gives individual distribution but they are uncertain as to how these markers behave independently. Unfortunately, Knežević & Demirdache did not have sentences with *svaki* separated from *po*, so we cannot offer a more direct comparison of these instances. It is noteworthy that during our act-out experiments, some Serbian adults repeated to themselves the test sentences using the *svaki-po* construction, even though we did not have this condition in our experiment. We can therefore speculate that having a *svaki-po* construction as an available (and possibly more productive) alternative to derive individual distributive readings could interfere with the acquisition of these distributive markers independently.

## 5. Conclusion

We looked at the acquisition of distributivity in a language with DS markers and compared it directly to a language with only DK markers. We also used a more versatile task in order to get more information about children’s reasoning and performance. We showed that Serbian children are significantly late in acquiring both DK and DS markers and that there is a third distributive competitor that potentially affects the acquisition of these markers. A good follow up study would be to test children and compare *svaki*, *po* and *svaki-po* constructions in order to identify potential differences. Dutch children, on the other hand, are much

quicker in acquiring DK markers and the pragmatic factors seem to affect Dutch and Serbian children differently. Our results will hopefully inspire additional research, especially with languages that have DS markers. For instance, increasing the number of items and numerals used in the experiment would be a good next step in understanding and teasing apart these pragmatic factors both for children and adults.

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# Proceedings of the 43rd annual Boston University Conference on Language Development

edited by Megan M. Brown  
and Brady Dailey

Cascadilla Press    Somerville, MA    2019

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ISSN 1080-692X  
ISBN 978-1-57473-096-8 (2 volume set, paperback)

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